A NEW MOSASAUROID REPTILE FROM THE CRETACEOUS OF ALABAMA.

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INTRODUCTION.

The specimen to be described was found in the L. C. Johnson collection belonging to the United States National Museum.

While the few fragmentary portions preserved indicate the mosasauroid affinities of the specimen, the unusual character of the teeth which differ so much from the dentition of the more typical mosasaurs that it becomes necessary to establish a new genus and species for its reception.

GLOBIDENS, new genus.

The characters of this genus are included in the description that follows of *Globidens alabamaensis*, the type-species.

GLOBIDENS ALABAMAENSIS, new species.

Type.—Cat. No. 6527, U.S.N.M. This specimen consists of the left maxilla, almost entire, containing mature and germ teeth, the frontal, posterior part of right presplenial, one posterior cervical vertebra, and numerous fragments.

Type-locality.—With the specimen was a label on which was the following data:—"Cretaceous, In Bogue Chitto Prairies west of Hamburg continuation of same. Perry and Dallas Co., Ala. Collected by L. C. Johnson." Unfortunately, the exact locality where this specimen was found can not now be learned.

Horizon.—The specimen was inclosed in a light-colored, chalky matrix, and Dr. L. W. Stevenson, of the United States Geological Survey, who is familiar with the rocks of this region, informs me that the specimen in all probability comes from the Selma chalk of the upper Cretaceous.

DETAILED DESCRIPTION.

Maxilla.—The left maxilla, lacking some of the posterior end, is present (see pls. 39 and 40), and shows this bone to be massive and stout as in *Brachysaurus overtonii*. There is evidence of at least ten teeth, and probably there were one or two more in the end, which is missing. The border meeting the premaxilla is very short, extend-

ing back only to the third tooth. The vertical part of this border is but a little shorter than the oblique portion. Back of this border, above the fifth tooth, is a rounded, free, emarginate edge marking the outer boundary of the narial opening. On the outer surface are two parallel rows of foramina, those of the lower row leading into the bases of the teeth. The border meeting the prefrontal is missing.

Measurements of maxilla.

	mm.
Greatest length as preserved	248
Greatest width over ninth tooth	55
Greatest width over second tooth	34
Width from alveolar border to narial border	51

Dentition.—In the maxillary there is evidence showing the presence of at least ten teeth, and the posterior end of this bone, which is missing, may have contained one or two more. (See pl. 40.)

Counting from the front, the first, second, fourth, and tenth teeth were lost in life, only the empty cavities remaining; the third, fifth, and eighth are represented by the broken bases of the crowns; the seventh and ninth, both mature teeth, are present and in a good state of preservation, as are the second, fourth, fifth, and sixth germ teeth. The dental series is well shown in plate 40.

The ninth maxillary tooth has a bulbous crown with a finely wrinkled enamel surface. This wrinkling of the enamel is coarsest at the apex and descending becomes gradually finer, ending in a nearly smooth surface on the lower constricted part of the tooth. As in all mosasauroid reptiles the tooth is attached to a spheroidal mass of ostein. On the posterior side of the ninth tooth there is a very faint carina which fades out before reaching the apex. The apex is worn.

The seventh tooth is slightly smaller in transverse diameter, with a more pronounced posterior carina. The shape of this tooth also differs from the ninth by a shallow depression encircling the base of the crown just above the more constricted neck, which meets the ostein base.

As shown by the broken crown, the fifth tooth has a similar encircling depression of the crown. The base of the eighth indicates that that tooth resembles the ninth more closely than it does those preceding it.

On the inner side of the dental border of the maxillary there are the usual pits or excavations, several of which contain young teeth in various stages of development.

The young tooth showing in the sixth socket appears to be more elongate vertically, with anterior and posterior carinæ which terminate in a slightly raised point on the apex of the tooth. The position of the carinæ on the inner and outer sides of the tooth, which is just emerging above the parapet of the jaw, appears to indicate a revolving movement of the tooth as it rises into place.

The other germ teeth, as well as the comparative size of the cavities, show that the teeth increase in size from front to back, the more anterior being somewhat elongated with subacute apices. The second germ tooth is elliptical in cross section.

The mature teeth contain in the interior a large conical pulp cavity, as shown by the broken base of the eighth tooth (see pl. 40).

Leidy,[1] in describing some isolated mosasaurian teeth, says: "They are generally divided in front and behind by an acute ridge into an inner and outer surface. In some teeth, apparently belonging to the most posterior dental series of the jaws, and to those of the pterygoid bones, there is only one ridge, which is situated along the back or concave border of the crowns." It is of interest to note a similar condition of the carinæ in the teeth described here.

It is in the peculiar type of dentition that this animal may be best distinguished from the other mosasaurians, and that these teeth indicate a food habit different from that usually attributed to members of this group is very evident.

Regarding the character of the food upon which the mosasaurs subsisted, Dr. S. W. Williston expresses the opinion that it "consisted almost exclusively of fishes, living or dead, and such small animals as drifted upon the water."[2] These observations are based upon those animals having the sharp, recurved teeth of the usual mosasaurian type. The teeth of *Globidens*, however, indicate different food habits.

The posterior teeth of this form were undoubtedly used only as crushing instruments, and being marine animals it is quite reasonable to suppose their food consisted of shell fish, crustaceans, etc., the harder portions of which were crushed between the bulbous teeth before being swallowed. The two functional teeth remaining intact show wear only on the very top.

Measurements.

	mm.
The sockets for 9 teeth occupy a distance on the maxilla of	210

	Teeth.		
	Ninth.	Seventh.	Sixth.
	mm.	*mm.*	*mm.*
Greatest antero-posterior diameter	253	225	185
Greatest transverse diameter	250	220	.....
Greatest height above ostein base	220	235	.....

Frontal.—The frontal bone is broad and heavy with the usual triangular shape. In its massiveness it resembles those of *Platycarpus* and *Brachysaurus*, more particularly the latter.

[1] Smiths. Contr. Knowl., vol. 14, 1865, p. 49.
[2] Univ. Geol. Surv. Kansas, vol. 4, 1898, p. 214.

Viewed from above the posterior surface of the frontal is flattened with the median part slightly concave transversely. Forward of this area the bone is convex in cross section, with a median ridge which extends forward to the broken end of the bone (see fig. 1). The posterior part of this edge is obtuse, but more anteriorly it has a sharp edge. In front of the center, on either side of the ridge, the bone is shallowly concave. The carinate condition of the frontal is also found in *Platycarpus* and, to a less degree, in some of the other genera. It is not present in *Tylosaurus*. The posterior border is nearly straight, with a slight median emargination where it meets the parietal. On either side of the middle the borders are broken so that the exact outline of this edge can not be determined, although it approaches the frontal of *Brachysaurus* more nearly than that of any of the other genera.

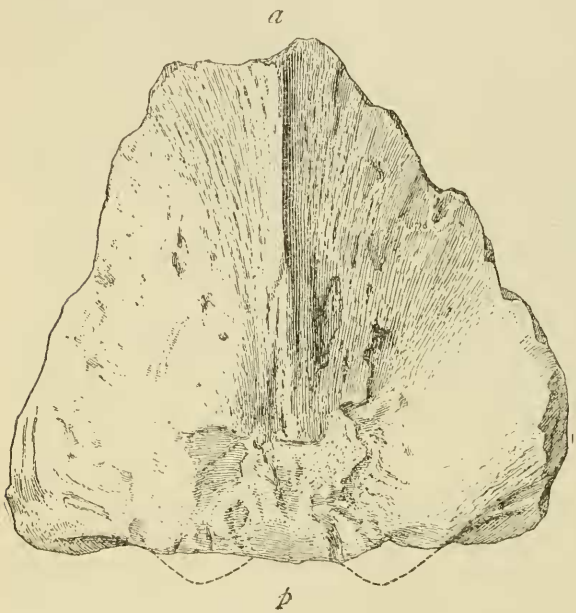

FIG. 1.—TOP VIEW OF FRONTAL OF GLOBIDENS ALABAMAENSIS. TYPE-SPECIMEN, ½ NATURAL SIZE. *a*, ANTERIOR END; *p*, POSTERIOR END.

The lateral margins are slightly undulatory and toward the front are convergent. The posterior angle, where this bone meets the post-frontal, is thickened. The median lateral margin forming the upper border of the orbit is slightly emarginate and obtusely rounded.

Immediately in front of the free orbital margin begins the line of union with the prefrontal. The entire pointed anterior part of this bone is missing, as shown in figure 1.

On the under side are two wide, massive parallel ridges which bound the cavity for the olfactory lobes. At the outer sides of these ridges the bone is deeply excavated for sutural union with the prefrontals.

Measurements of frontal.

	mm.
Greatest width of frontal	160
Greatest length of frontal	147
Greatest width between orbital margins	112
Greatest width olfactory cavity	24

The greatest width of the frontal of *Brachysaurus* is also 160 mm.

Presplenial.[1]—A portion of the posterior part of the right presplenial shows that *Globidens* has the joint in the lower jaw as in the other genera of this group.[2] The portion preserved is massive, with the usual cupped articular end. The outer surface is rounded toward the lower margin, and the articular surface for union with the dentary approaches close to the posterior end as in *Mosasaurus*.

The upper side of this end is U-shaped in section, with each side extending upward as a thin margin, the inner portion being higher and heavier than the outer. Thirty millimeters from the posterior end on the inner side is a large foramen (see fig. 2), extending forward into the groove for Mechel's cartilage. The anterior part of this bone is missing. The articular end has a transverse width of 27 mm.

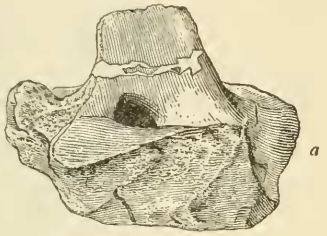

FIG. 2.—INNER VIEW OF POSTERIOR PART OF RIGHT PRESPLENIAL GLOBIDENS ALABAMAENSIS. TYPE-SPECIMEN, ½ NATURAL SIZE. *a*, POSTERIOR OR ARTICULAR END.

Vertebra.—There is only one vertebra preserved with this specimen and though undistorted by pressure the processes of this bone have been much damaged. Its chief characteristics are well shown in figure 3.

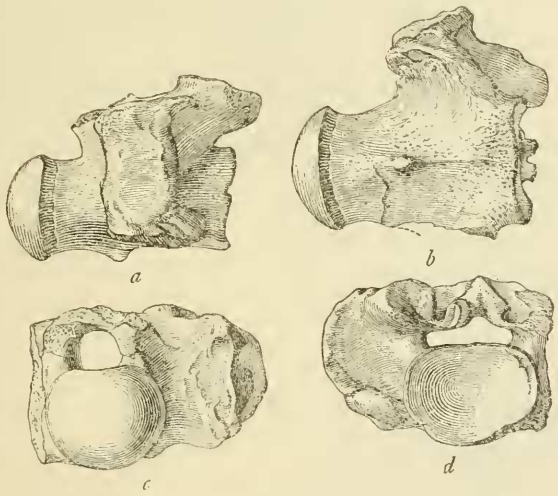

FIG. 3.—POSTERIOR CERVICAL VERTEBRA OF GLOBIDENS ALABAMAENSIS, (*a*) LATERIAL VIEW; (*b*) VENTRAL VIEW; (*c*) POSTERIOR VIEW; (*d*) ANTERIOR VIEW. TYPE-SPECIMEN, ½ NATURAL SIZE.

The presence of heavy transverse processes and a rudimentary hypapophysis indicates this vertebra to be one of the posterior cervicals, probably the sixth.

In the general proportions of the centrum it resembles the vertebræ of *Platycarpus* more nearly than any of the other genera with which it was compared.

[1] Presplenial of Williston; splenial or opercular of other authors.

[2] Williston (Univ. Geol. Surv. Kansas, vol. 4, 1898, pp. 212-213) has discussed at some length the use of the peculiar ball and socket articulation at the middle of the lower jaw, and concludes that, in the true mosasaurians, it is to allow the lateral expansion of the jaws when swallowing large objects. It is of interest to note in this specimen a similar articulation, although, as indicated by the dentition, the food must have been of quite a different nature, and the use of such a joint is not easily accounted for.

On the anterior end is evidence of a zygosphene articulation, and although somewhat rudimentary, it appears to have been functional. In the weakness of this articulation this vertebra approaches those of *Platycarpus* and *Plioplatycarpus*.

The general character and proportions of this vertebra are well shown in the figures, and it appears unnecessary to further describe them.

Measurements of vertebra.

	mm.
Greatest length of centrum	61
Greatest width anterior end	36
Greatest width posterior end	33
Greatest depth posterior end	27
Greatest depth anterior end	29
Greatest width transverse process	87

Relationships.—The fragmentary nature of the type-specimen makes it impossible to say much of the relationships of this form, although the manner of tooth replacement and other characters of the maxilla, frontal, presplenial, and vertebra indicate *Globidens* to be a true member of the Pythonomorpha.

The short, massive maxilla and broad, heavy frontal give evidence of this animal having a short, broad, heavy skull of the *Platycarpus* or *Brachysaurus* type. The presence on the one vertebra found of a small but probably functional zygosphene articulation would further indicate its affinity with *Platycarpus*, and on account of the characters enumerated above, *Globidens* is referred for the present to the family Platycarpinæ.

EXPLANATION OF PLATES.

PLATE 39.

Side view of left maxilla of *Globidens alabamaensis*, ¾ natural size. Type-specimen, Cat. No. 6527, U.S.N.M.

PLATE 40.

Oblique view of dental border of left maxilla of *Globidens alabamaensis*, ¾ natural size. Type-specimen, Cat. No. 6527, U.S.N.M.